SINTESIS 2-MONOASIL GLISEROL MELALUI REAKSI ALKOHOLISIS DAN UJI AKTIVITASNYA SEBAGAI ANTIBAKTERI SERTA ANTIJAMUR

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INTISARI

Senyawa 2-monomiristin dan 2-monopalmitin telah berhasil disintesis dan diuji aktivitasnya sebagai antibakteri dan antijamur. Tujuan penelitian ini untuk mendapatkan jalur sintesis baru untuk monoasil gliserol secara enzimatis.

Sintesis senyawa target melibatkan 2 tahapan yaitu pertama reaksi esterifikasi asam miristat dan asam palmitat dengan gliserol menggunakan katalis asam sulfat 98% pada temperatur 110 -120 °C selama 2,5 jam untuk trimiristin dan 140 °C selama 4 jam untuk tripalmitin. Tahap kedua, sintesis 2-monomiristin dan 2-monopalmitin melalui etanolisis menggunakan enzim lipase *Lipozym TL IM* pada suhu 50 °C selama 24 jam. Identifikasi struktur senyawa hasil sintesis dilakukan menggunakan FT-IR, DI-MS, LC-MS, ^{1}H-NMR, dan ^{13}C-NMR. Selanjutnya, uji aktivitas antibakteri dan antijamur senyawa 2-monomiristin dan 2-monopalmitin dilakukan terhadap bakteri Gram positif *Staphylococcus aureus*, bakteri Gram negatif *Escherichia coli*, dan jamur *Candida albicans*.

Hasil penelitian menunjukkan bahwa senyawa trimiristin, tripalmitin, 2-monomiristin, dan 2-monopalmitin berhasil disintesis dengan rendemen berturut-turut sebesar 54, 53, 18 and 8%. Hasil uji aktivitas antibakteri dan antijamur menunjukkan bahwa senyawa 2-monomiristin memiliki aktivitas antibakteri dengan daya hambat terbesar pada konsentrasi terendah 0,25% dengan rerata persentase daya hambat sebesar 91,99 dan 93,17% masing-masing untuk bakteri *Staphylococcus aureus* dan *Escherichia coli.* Senyawa 2-monopalmitin tidak memiliki daya hambat terhadap bakteri *Staphylococcus aureus* dan *Escherichia coli*. Kedua senyawa target tidak memiliki aktivitas antijamur terhadap *Candida albicans.*

Kata kunci: *monogliserida, alkoholisis, 2-monomiristin, 2-monopalmitin, antibakteri dan antijamur*

SYNTHESIS OF 2-MONOASYL GLYCEROLS THROUGH ALCOHOLYSIS REACTION AND THEIR ANTIBACTERIAL AS WELL AS ANTIFUNGAL ACTIVITY TESTS

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ABSTRACT

2-Monomiristin and 2-monopalmitin have been synthesized and tested for antibacterial and antifungal activities. The purpose of this research is for finding new synthesis methode of monoasyl glycerol by enzimatic reaction.

The synthesis of 2-monomyristine and 2-monopalmitin was performed through two main stages, the first was the synthesis of triglyceride by esterification reaction of myristic and palmitic acid with glycerol using 98% sulfuric acid as catalyst at 110-120 °C for 2,5 hours for trimiristin and 140 ˚C for 4 hours for tripalmitin. The second step was synthesis of 2-monoasyl glycerol compounds by reacting triglyceride (trimyristin and tripalmitin) and ethanol using Lipozym TL IM enzyme as the catalyst for 24 hours at 50 °C. Structural elucidation of the synthesized compounds was carried out using FT-IR, DI-MS, LC-MS, ^{1}H-NMR and ^{13}C-NMR spectrometers. Antibacterial and antifungal activity tests of 2-monomyristin and 2-monopalmitin were conducted against Gram-positive bacteria *Staphylococcus aureus,* Gram-negative bacteria *Escherichia coli,* and *Candida albicans* yeast.

The results showed that trimiristin, tripalmitin, 2-monomiristin, and 2-monopalmitin compounds were successfully synthesized with 54, 53, 18 and 8% yield respectively. The results of antibacterial and antifungal activity test showed that the 2-monomiristin compound had antibacterial activity with the greatest inhibitory at the lowest concentration of 0.25% 2-monomiristin with mean percentage inhibitory power of 91.99 and 93.17% respectively for *Staphylococcus aureus* and *Escherichia coli*. The 2-monopalmitin compound had no inhibitory power against *Staphylococcus aureus* and *Escherichia coli* bacteria. Both target compounds had no antifungal activity for *Candida albicans*.

Keywords: *monoglyceride, alcoholysys, 2-monomyristin, 2-monopalmitin, antibacteria, and antifungal.*